

A quick guide for evaluating classroom content and practice

In grade 8, instructional time should focus on three critical areas:

1.

Formulating and reasoning about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems of linear equations (EE)

2.

Grasping the concept of a function and using functions to describe quantitative relationships (F)

3.

Analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem (G)

In an 8th grade math class you should observe students engaged in at least one of the following:

Mathematical Practices

- Making sense of problems and persevering in solving them
- Reasoning abstractly and quantitatively
- Constructing viable arguments and critiquing the reasoning of others
- Modeling with mathematics
- Using appropriate tools strategically
- Attending to precision
- Looking for and making use of structure
- Looking for and expressing regularity in repeated reasoning

Content Standards

The Number System (NS)

- Understanding that there are numbers that are not rational and approximating them by *rational numbers*

Expressions and Equations (EE)

- Working with *radicals* and *integer exponents*
- Understanding the connections between proportional relationships, lines, and *linear equations*
- Graphing *proportional relationships*, interpreting the *unit rate* as the *slope* of the graph
- Analyzing and solving linear equations whose solutions require expanding expressions using the *distributive property* and collecting *like terms*
- Solving *systems* of two linear equations in two variables algebraically (by *graphing*, *substitution* or *elimination*)

Statistics and Probability (SP)

- Constructing and interpreting *scatterplots* to investigate patterns of association between two quantities
- Using the equation of a linear model to solve problems by interpreting the *slope* and *intercept*

Functions (F)

- Comparing properties of two *functions* each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions)
- Constructing a function to model a linear relationship between two quantities (*rate of change*, *slope*, *initial value*)
- Qualitatively analyzing or sketching a graph to show *increasing/decreasing* or *linear/non-linear* functions

Geometry (G)

- Understanding *congruence* and *similarity* using physical models, transparencies, or geometry software
- Understanding and applying the *Pythagorean Theorem* in real-world and mathematical problems
- Solving real-world and mathematical problems involving *volume* of *cylinders*, *cones* and *spheres*

NOTES

Mathematics What to Look For The example below features three Indicators from the [Standards of Effective Practice](#). These Indicators are just a sampling from the full set of Standards and were chosen because they create a sequence: the educator plans a lesson that sets clear and high **expectations**, the educator then delivers high quality instruction, and finally the educator uses a variety of **assessments** to see if students understand the material or if re-teaching is necessary. This example highlights teacher and student behaviors aligned to the three Indicators that you can expect to see in a rigorous 8th grade math classroom.

Expectations (Standard II, Indicator D)	Plans and implements lessons that set clear and high expectations and also make knowledge accessible for all students.
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<p style="text-align: center;">What is the teacher doing?</p> <ul style="list-style-type: none"> •Communicating a lesson's objectives and their connections to unit essential questions and goals. •Creating culturally responsive lessons that engage and sustain student attention •Focusing attention on mathematical language (e.g., linguistic complexity, conventions, and vocabulary) •Establishing classroom routines that support students to defend their thinking 	<p style="text-align: center;">What are the students doing?</p> <ul style="list-style-type: none"> •Applying mathematical strategies and concepts when engaging with meaningful real-world problems •Using mathematical language precisely to convey meaning and understanding of concepts •Justifying a solution method and critiquing the reasoning of others •Identifying important quantities in a given relationship and representing situations. (e.g. using diagrams, or formulas)
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Instruction (Standard II, Indicator A)	Uses instructional practices that reflect high expectations regarding content and quality of effort and work; engage all students; and are personalized to accommodate diverse learning styles, needs, interests, and levels of readiness.
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<p style="text-align: center;">What is the teacher doing?</p> <ul style="list-style-type: none"> •Creating a culture of being careful and precise when communicating mathematical ideas •Sharing conflict resolution strategies for working together with students •Modeling actively incorporating others into discussions 	<p style="text-align: center;">What are the students doing?</p> <ul style="list-style-type: none"> •Actively incorporating others into discussions about mathematical ideas •Using equations and diagrams to represent patterns •Evaluating the relative strengths and weaknesses of solution methods orally and in writing
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Assessment (Standard I, Indicator B)	Uses a variety of informal and formal methods of assessments to measure student learning, growth, and understanding to develop differentiated and enhanced learning experiences and improve future instruction.
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<p style="text-align: center;">What is the teacher doing?</p> <ul style="list-style-type: none"> •Using multiple formative approaches to assess students (e.g., mid-unit assessment, group work) •Conducting frequent checks for student understanding and adjusting instruction accordingly •Prompting students to explain their reasoning and listening to their responses to identify misconceptions 	<p style="text-align: center;">What are the students doing?</p> <ul style="list-style-type: none"> •Purposefully incorporating feedback from teacher and peers into actions •Engaging in challenging learning tasks regardless of learning needs (e.g., linguistic background, disability, academic gifts) •Using exemplars to inform their work
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